Laboratories for Micro– and Nanotechnology

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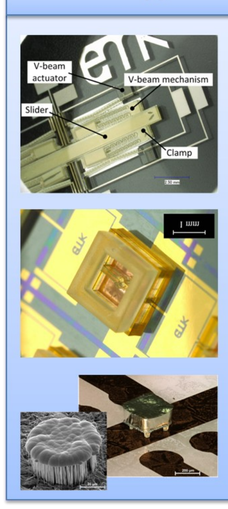
Cleanroom Laboratory

Application examples



- Micro relays and micro positioning systems
- Acceleration and gas flow sensors
- Electrical micro-nano contacts
- Bio cell interfaces
- Microfluidics
- RF MEMS
- Force and pressure sensors

Sputtering

Alcatel
- DC/ HF Sputtering with RF-Bias
- 4 Cathodes
- Al, Cr, Cu, SiO_2
- Deposition Rates up to 1000 nm/min
- Vacuum Prechamber

Vapour Deposition

Balzers BAK 600
- Electron Beam and Resistance Evaporator
- Al, Cu, Cr, Ni, Ag, Ti, Au, Al_2O_3
- Thickness Controll through Quartz Resonator

Isotrop Etching

Muegge STP 2020
- Remote Downstream Plasma Reactor for Polymer Etching (e.g. SU-8, BCB)
- O_2, CF_4, N_2
- RF-Power: 3000 W at 13,56 MHz

Anisotrop Etching

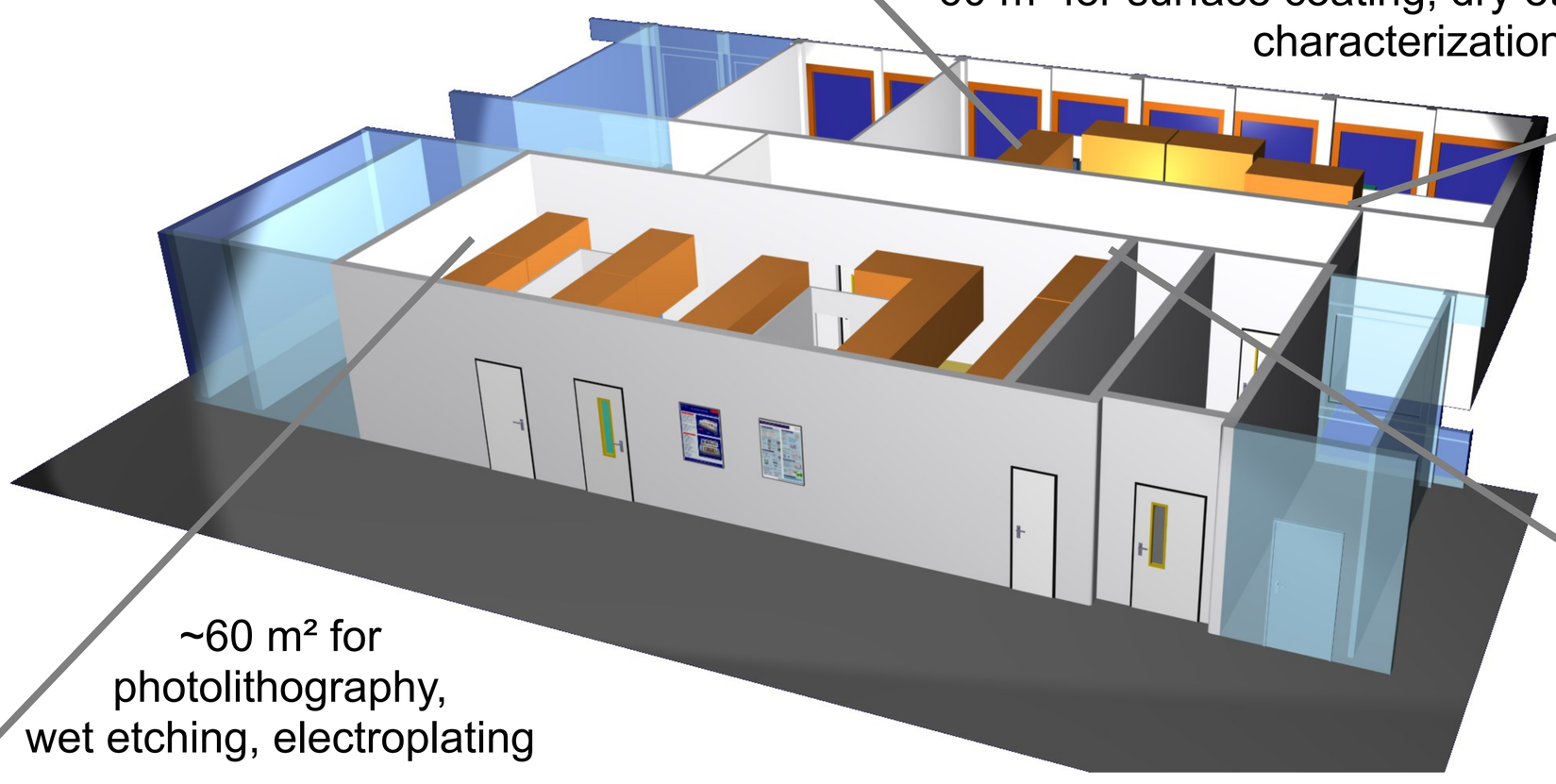
Plasma Technology RIE80
- Parallel Plate Reactor for Substrate Cleaning and Polymer Etching
- O_2, CF_4, N_2
- RF-Power: 300 W at 13,56 MHz

Wire Bonder

F&K Delvotek 53xx-BDA Bonder
- Ball Bonding down to 18 µm gold wire
- Deep access wedge bonding
- Automated y-axis for automated loops

Optical Inspection

Keyence VHX-600
- 3CCD Camera
- 54 Mio Pixel
- Magnification up to 1000x
- 3D Measurement Option
- Measurements of Structural Widths



Classification:
1000 - 100 within the laminar airflow boxes

Surface Activation

Technics 300-E Plasma
- Barrel Reactor for Substrate Cleaning and Surface Activation
- O_2, CF_4, N_2
- RF-Power: 300 W at 13,56 MHz

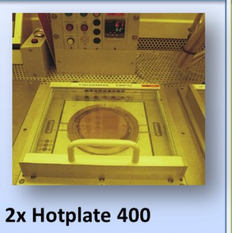
Spin Coater

SÜSS Delta 80 BM
- Rotating Lid
- Up to 4000 rpm

SÜSS LabSpin 6
- Up to 8000 rpm

Photo Resists
- SU-8 2000/3000
- AZ 9260
- AZ 15, 40, 125 (n)XT

Hotplates



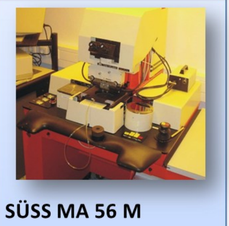
2x Hotplate 400
- Programmable Single Plate
- Up to 130 °C

3x GESTIGKEIT PR 5-3T
- Programmable Double Plate
- Up to 300 °C

IR Oven

FH Zwickau
- IR dry system for photoresist
- Up to 6“ wafer
- Max. heat 130 °C
- Maximum substrate weight 150 g

Mask Aligner



SÜSS MA 56 M
- 350 W UV-Lamp
- Up to 4“ Masks
- Manual Alignment
- Up to 20 mW/cm²
- Process Monitoring

Filters
- g, h, i - Line
- g, h - Line
- i - Line

Developer

Sonosys 500
- Frequency 1 MHz
- Power 50 - 500 W

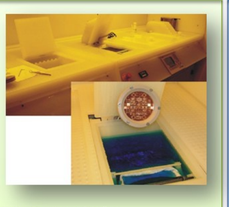
Multi-Bio-3D
- Orbital Shaker

Developer
- mr-Dev 600
- MIF 326, 826
- AZ 400k

Surface Profiler

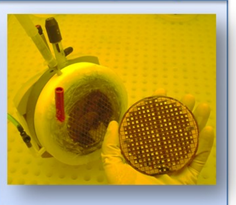
DEKTAK 8 Profiler
- Measurement of Layer Thickness and Surface Profile
- Range from 10 nm up to 1 mm
- Stylus Force up to 0,09 mg

Micro Electroplating



M-O-T µGalv
- Additive free Electrolytes
- Nickel (pH 4), Copper (acid)
- Currents up to 10 A
- Puls-Plating Option
- Plating rate up to 4 µm/min

Micro & Nano Electroplating



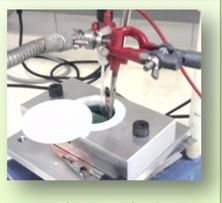
silicet trio clip
- 3 electrodes cell for 4“ wafer
- Ion membrane for use with additives
- 1 µA - 3 A reverse pulse plating to extend to 100 kHz
- 2 l volume with particle filter

Additional Technology

Polishing Machine

Logitech PM5
- Precision Polishing Jig with vacuum adapter
- Up to 4“ wafer
- Plate Speed: 0-70 rpm
- Chemical Mechanical Polishing option

Nano Electroplating



Nano Electroplating Cell
- Potentiostatic and Galvanostatic Plating
- Pulse- & Reverse-Puls-Plating up to 100 kHz
- Currents down to several nA

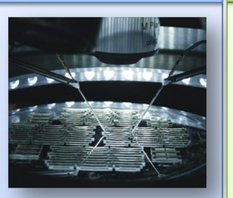
Micro Assembly

Arteos TOMM 1
- Pic and placer
- Plate- and air-heater
- UV-curing
- Micro-dispenser
- Vacuum chuck

Bond Shear Tester

dage Microtester 22
- Testing strength of solder joints, wire bonds and more
- Stitch Test Failure Detection
- 20 gm & 10 kg Load
- Resolution +/- 0,5% of load

Motion-Analyzer

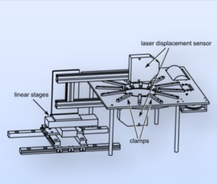


MEMS-Analyzer
- 2048 x 2048 Pixel
- 15 fps, 800 MBit/s
- Repeatability < 30 nm
- Force Measure-ments up to 1 N
- Field of View up to 11,7 x 11,7 mm²

Thermography

FLIR SC655
- 640 x 480 Pixel
- -20°C to +150°C 0°C to 650°C
- Sensitivity: <0.05°C @ +30°C

EAP Characterization



EAP-Analyzer
- Static / dynamic deflection (line scan)
- Frequency response
- Preload simulation
- Sheet resistance
- Force-displacement

Laser Vibrometer

Polytec OFV 2502
- 2 sensor heads (OFV 534)
- Velocity demodulation
- 1.5 MHz

Polytec OFV 3001
- Velocity demodulation 0.3 µm/s...10 m/s

High-Pressure Static Tester

COP-7000
- 500 MPa=5000 bar
- silicon oil
- Room temperature

Pressure sensor
- P3MBP 5000 bar (HBM)

Piston gauge
- 5ppm @ 5 000 bar
- 1 kg / 50 bar

High-Pressure Dynamic Tester

MAXIMATOR
- up to 1000 bar
- Periodic load at 0.1 Hz to 20 Hz
- Curve shape rectangular, trapezoid or sinus
- 4 pressure connectors

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